Abstract

In time yield estimation of a crop is essential for the economy of a country. It is also important for planners to have an accurate and precise estimate of a crop and this especially important when the crop is insufficient to meet the demand of the country. As among all the crops, wheat is the most important staple food of Pakistan, so the most of government agricultural polices are wheat oriented. Pakistan faced a very serious shortage of wheat and in the late 2007 and this created a serious challenge to law and order.

The prime objective of this research is to build a statistical model in a scientific way, using all available ground information, so that a good and reliable estimate of wheat crop can be achieved at least two months prior to the arrival of actual production of the crop. Also a comprehensive descriptive study has been conducted regarding the wheat production in the Punjab taking various dimensions of explanatory variables.

In the detailed descriptive study, impact of irrigated / un-irrigated areas, sowing time, fertilizers, pesticides spray, seed quantity, number of water (number of turns same amount of water is supplied to one acre of wheat on different times during the whole growing season of the crop), number of plough, number of level (number of turns ground level of the field is smoothened for even distribution of water throughout the field and for moisture conservation) , seasonal rainfall, seasonal humidity level, maximum / minimum average temperature of the season and also different combination of these variables on the quantity of yield of the crop has been examined, which has revealed many folded dimensions.

A new methodology titled as 'Weighted Rainfalls' is created to develop a stronger relationship between yield of wheat and seasonal rainfalls because rainfalls of different months of Rabi season have varying impact on the final yield of wheat, which leads to the need of weighted rainfalls. The concept of weighted rainfalls verified very effective in estimation of wheat production

through the statistical model. Different criteria like MSE, AIC and SIC for competing models have also supported that estimates of wheat using weighted rainfalls concept are better than the estimates using total rainfalls of the season.

After the development of the model, its validity has been examined through different confirmation runs. All validity runs also have supported that the developed model is working properly and can be used as general wheat's model for its projection in any year. This concept can be easily extended for other crops using weighted rainfall pattern for that crop.

As, this study is based on the sample data taken from the whole province, so a method of unequal probability sampling using more than one measure of sizes has also been proposed for the sake of an improvement in the sample selection of villages giving priorities to more than one parameter of interest. Obviously a suitable sample of villages having a reasonable representation of all the major surveyed crops of the province will ultimately give a good estimate of a crop.